DOCUMENT RESUME

ED 122 312 CS 501 327

AUTHOR Heald, Gary R.
TITLE A Comparison of Systematic Desensitization and Conditioned Relaxation in Reducing Speech Anxiety.
PUB DATE 76
NOTE 25p.; Paper presented at the Annual Meeting of the Instructional Division of the International Communication Association (Portland, Oregon, April 1976)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage
DESCRIPTORS *Anxiety; Behavioral Science Research; Communication (Thought Transfer); Comparative Analysis; Educational Research; Higher Education; *Speech; *Teaching Methods; *Training Techniques
IDENTIFIERS *Conditioned Relaxation; Speech Communication; *Systematic Desensitization

ABSTRACT

Speech and communication departments at several universities currently offer behavioral training programs aimed at reducing communication-related anxiety. Traditionally, these programs involve the use of a "systematic desensitization" training method. An alternative behavioral training method is found in "conditioned relaxation." This paper discusses the theoretical rationale at the bases of the two training techniques, plus the comparative advantages found in each. Next a series of empirical studies are introduced. Specifically, a pilot study yields a parsimonious set of scales which are consistent with theoretical conceptualizations of the anxiety phenomenon. The scales are then employed in an experimental comparison of systematic desensitization and conditioned relaxation in reducing communication-related anxiety. Experimental results reveal that both systematic desensitization and conditioned relaxation are effective in reducing subjects' dispositions to be anxious in communication situations that they perceive as threatening. No differences are found in the effectiveness of the two training methods in reducing anxiety. (Author)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ED122312

A Comparison of Systematic Desensitization and Conditioned Relaxation in Reducing Speech Anxiety

Gary R. Heald

Department of Communication

Michigan State University

July, 1975

"PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL HAS BEEN GRANTED BY

Gary R. Heald

TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE NATIONAL INSTITUTE OF EDUCATION. FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER."

The author gratefully acknowledges the assistance of Dr. David Ralph, Dr. Edward Fink and Ms. Shirley Ambroziak.

Paper submitted to the Instructional Division of the International Communication Association--Portland, Oregon, April, 1976.

CS 501 327

Abstract

Speech and Communication Departments at several universities currently offer behavioral training programs aimed at reducing communication-related anxiety. Traditionally, these programs involve the use of a "systematic desensitization" training method. The overall success of this training method is well established, though there are numerous situations where systematic desensitization is ineffective. An alternative behavioral training method is found in "conditioned relaxation."

This paper discusses the theoretical rationale at the bases of the two training techniques, plus the comparative advantages found in each. Next a series of empirical studies are introduced. Specifically, a pilot study yields a parsimonious set of scales which are consistent with theoretical conceptualizations of the anxiety phenomenon. The scales are then employed in an experimental comparison of systematic desensitization and conditioned relaxation in reducing communication-related anxiety.

Experimental results reveal that both systematic desensitization and conditioned relaxation are effective in reducing subjects' dispositions to be anxious in communication situations that they perceive as threatening. No differences are found in the effectiveness of the two training methods in reducing anxiety.

A Comparison of Systematic Desensitization and Conditioned Relaxation in Reducing Speech Anxiety

With the growing awareness that experience-oriented communication classes can have counterproductive effects for persons with high communicative apprehension, a number of universities now offer behavioral training programs aimed at reducing communication-related anxiety. Typically employing "systematic desensitization" (S. D.) procedures, these programs provide instruction in muscular relaxation techniques combined with corresponding practice in visualizing anxiety-producing situations. An alternative approach to anxiety reduction has been recently proposed. This alternative method, known as "cue-controlled (conditioned) relaxation" (C. R.), also employs muscular relaxation. Unlike S. D., however, conditioned relaxation links the state of relaxation with a self-produced cue word.

It will be the purpose of this paper to review the two training methods, systematic desensitization and conditioned relaxation. Attention will initially be given to the theoretical principles and empirical findings supportive of the techniques. The discusssion will then focus on a pilot study conducted to develop a measurement instrument that can be used to identify persons with high speech anxiety. A final section of the paper will report an experimental study comparing the relative effectiveness of S. D. and C. R. in reducing communication-related anxiety. Discussion begins with an introductory consideration of the communication anxiety phenomenon.

That anxiety can have debilitating effects is widely recognized. The terms "stage fright," "speech anxiety," and "communicative apprehension" all refer to a set of cognitive and physical response patterns that often manifest

themselves in inhibited communication.[1] Previous investigators have conceptualized anxiety as having both "state" and "trait" aspects. The state of anxiety is

> . . . a transitory emotional state or condition . . . characterized by subjective, consciously perceived feelings of tension and apprehension, and activation of the autonomic nervous system. Trait anxiety, on the other hand, refers to . . . the disposition or tendency to respond with elevations of state anxiety in situations that are perceived as threatening.[2]

In particular speech anxiety appears to develop when individuals perceive communication exchanges as sources of "threat to their self-esteem or social goals."[3]

Among the most popular behavioral training methods for dealing with anxiety is systematic desensitization. Based on the rationale that the elicitation of one response necessarily precludes the simultaneous elicitation of opposite responses, systematic desensitization links responses that are antagonistic to anxiety with actual anxiety-evoking stimuli.[4] Specifically, desensitization first entails the teaching of progressive, deep muscular relaxation.[5] Deep muscular relaxation involves tensing and releasing exercises conducted with distinct sets of muscles (i.e., hands, lower and upper arms, upper and lower face, neck, shoulders, abdomen, upper and lower legs, and finally feet muscles). Following the exercises, when a state of relaxation is attained, the subjects are asked to visualize a hierarchical series of anxiety-evoking situations.[6] Each succeeding situation is intended to create greater anxiety. For the case of speech anxiety, the visualization situations are steps taken in preparing and making oral presentations. By linking the state of muscular relaxation to situations that normally produce anxiety for the subject, there is in theory a weakening of the actual anxiety response.

On the average desensitization training lasts three to five weeks with two training sessions per week. There are, nonetheless, instances of S. D. requiring a median number of 16-23 sessions.[7] Between training sessions subjects are encouraged to practice the technique daily.

The success of systematic desensitization in reducing anxiety is well documented.[8] There are numerous reports of S. D. leading specifically to reduced communication-related anxiety.[9] Desensitization appears to be a useful counterconditioning method, though findings cannot be overlooked which show S. D. to not be well suited for all anxiety situations. Difficulties arise when persons experience anxiety in a large number of areas--necessitating the use of multiple hierarchies. There is an inverse relationship between the number of areas in which anxiety is experienced and the success of desensitization training.[10] Persons who have difficulty in vividly imagining anxiety situations likewise have less success with S. D.[11] Finally, there are individuals who can achieve vivid imagery of situations that should produce anxiety without actually experiencing the anxiety response.[12] In instances such as these, systematic desensitization will be of minimal value, and may be impractical altogether.

In contrast, a second method of reducing anxiety is found in conditioned relaxation. C. R. begins with progressive muscular relaxation. Under this method, however, when the subjects are completely relaxed, they are asked to focus attention on their breathing. Each time subjects exhale they are to repeat to themselves a cue word.[13] By pairing the deep muscular relaxation with a cue word, the state of relaxation becomes associated with the self-produced cue.[14] Through a conditioning process, relaxation becomes the response to focused attention on breathing combined with a verbal stimulus.

Documentation of the effectiveness of C. R. is limited. One of the few studies available shows cue-controlled relaxation leading to reduction in test anxiety, with reference made to like success in diminishing speech anxiety and impotency.[15] Experience has shown conditioned relaxation to have the advantage of requiring slightly less time (than systematic desensitization) to teach and practice. With C. R. favorable outcomes are not linked to the individual's capacity to visualize anxiety-evoking situations; and more important still, C. R. is theoretically a generalizable response. A person who associates a self-produced cue word with relaxation should be able to apply the cue to a variety of anxiety situations with favorable effect.

In comparing the S. D. and C. R. methods, the question of how to detect the presence of excessive communication-related anxiety is of fundamental importance. A literature search yielded twenty-five scales that, in varying combinations, have been commonly used for studies of speech anxiety. Previous researchers have had confidence that subject responses to these items, when summed together, measured the anxiety construct. To further establish the nature of the measured construct(s), a pilot study was conducted.

PILOT STUDY

The twenty-five scales were modified to five-point Likert-type items and were administered to 683 undergraduate students in introductory communication classes.[16] Two of the twenty-five scales proved to be ambiguous. Subjects complained they did not understand what the items were saying; the two scales as a result were evaluated as unacceptable for experimental use. Resulting data were factor analyzed to isolate underlying attributes. This procedure, after "varimax rotation," revealed two primary factors. To further derive

a parsimonious set of scales, indices representing the primary factors were constructed by summing the scale values, using factor score coefficients as weights. The weighted-summed indices were then regressed on those variables loading greater than .50 on the respective factors; the variables were also weighted by factor score coefficients. It was determined that eight scales were needed to have a multiple correlation of .91 with the first factor. Seven different scales were required to obtain a multiple correlation of .90 with the second factor. These multiple correlations are the values after correction for shrinkage. Thus a total of fifteen scales were identified as a parsimonious subset for measuring the two dimensions of speech anxiety--a reduction of forty percent.

Reliability coefficients were determined for the fifteen scales. Based on data collected from a sample of 117 undergraduate students, a test-retest correlation of $r = .76$ was found for the eight items measuring the first factor. A test-retest correlation of .78 resulted for the seven scales measuring the second factor. These tests were measures of consistency using administrations separated by a four-week interval.

"Principal components" analysis of the fifteen scales produced two factors. Examining those variables loading .60 or more on one of the factors, but no higher than .40 on the other, it appeared that the first factor represented subject reports of behavioral and physiological manifestations of anxiety occurring in actual speech situations. For instance, persons scoring high on this factor would report that their hands tremble, they perspire and tend to become confused when speaking before a group. The second factor indicated respondent feelings about speaking to other people. A high score on

this factor would indicate that the individuals did not look forward to speaking in public, and after speaking they did not feel that they had had a pleasant experience. The resulting factors are highly consistent with the general conceptualizations of "state" and "trait" anxiety, and will be referred to as such in the remainder of this discussion. It was decided that weighted-summed indices employing factor score coefficients as weights would be used to obtain measures of the two constructs.

After isolating and interpreting a reliable set of measures that are few enough to allow ease in administration, the weighted indices were applied in an experimental test comparing the systematic desensitization and conditioned relaxation methods for reducing anxiety. The experimental test was conducted to evaluate the tenability of the following hypotheses:

H_1 For persons experiencing anxiety in public speaking situations, training in systematic desensitization will reduce speech anxiety.

H_2 For persons experiencing anxiety in public speaking situations, training in cue-controlled (conditioned) relaxation will reduce speech anxiety.

Finally, the experiment was designed to test the research hypothesis that:

H_3 For persons experiencing anxiety in public speaking situations, there will be no difference in reductions of speech anxiety following training in systematic desensitization versus conditioned relaxation.

A significance level of $p < .05$ was set for rejecting the null hypotheses. Significance levels will be reported for the reader's information.

METHOD

Pre and post experimental manipulation measures were taken of subjects in systematic desensitization and conditioned relaxation training conditions. Pre and post tests were also completed by subjects serving as a control group.

Measures in all three conditions were separated by a four-week time period; a fourth group of subjects took the post manipulation test only. The reader is alerted that this experimental test deviates in some ways from normal experimental procedures. For example, subjects in the two training conditions were identified by their initial scores on the anxiety test when given at the beginning of the term to all students in an introductory communication course. Students scoring one standard deviation or higher above the mean were invited to participate in the training sessions. Those students accepting invitations were randomly assigned to receive either S. D. or C. R. instruction. Control and post manipulation only measures were taken from students of intact communication classes who did not receive counterconditioning training. A total of thirty-seven students in the S. D. experimental condition took the pre and post manipulation test; thirty-two students in the C. R. condition completed the two tests. Eighty-three students in the control classes completed the tests, while fifty-five students took the post-test only.

Eighteen training groups were used in this experimental study--nine groups teaching systematic desensitization and nine groups teaching conditioned relaxation.[17] Trainers for the experimental groups were upper level undergraduate students who were knowledgeable in both S. D. and C. R. methods.[18] Each trainer was assigned to teach students in S. D. and C. R. conditions. It should be noted here that all statistical analyses were performed at the group level, as the subjects' responses are likely <u>not</u> independent of other responses in their groups.

Those persons invited for and who accepted training were more anxious than the control classes. Analyses of the control and treatment groups revealed

that the groups were significantly different prior to training. For the trait anxiety factor there was a difference of ($F = 6.20$, $p < .005$); the three groups were different ($F = 11.40$, $p < .001$) based on the state anxiety index (Table 1). Before training the two treatment groups were comparable in terms of the anxiety measures. T-tests for the two indices indicated that the random assignment of subjects to the training conditions resulted in no significant differences between the S. D. and C. R. groups (Table 2).

RESULTS

As mentioned earlier all subjects were students in introductory communication classes. These classes are experience-oriented and include small group activities and individual speeches; thus some reductions in subject anxiety are anticipated due to course instruction and class assignments. Scores for persons completing the pre and post tests in the control group are compared first to ascertain base-line levels of change. Employing t-tests for correlated means, there is no difference between trait anxiety scores ($t = 1.11$, $p < .30$; Table 3), but a significant difference is observed between the pre and post tests for state anxiety ($t = 2.95$, $p < .005$). Though not formally being tested, this change in state anxiety is potentially attributable to the control students gaining insight and experience in communication techniques. Irrespective of the reason, this change must be taken into consideration in evaluating differences that appear in the anxiety scores of the treatment groups.

Attention is directed next to ascertaining the effect of repeated exposure to the test instrument. It should be recalled that the control group took both a pre and a post test; the post-test only group did not have prior

experience with the questionnaire. Comparing the post manipulation scores between the control and post-test only groups, no significant differences are found for either anxiety index (Table 4). The administration of the measurement instrument early in the term, in other words, does not seem to have appreciably influenced the post manipulation scores.

Anxiety scores for persons in the training conditions do change in the hypothesized directions (Table 5). There are substantial reductions in the levels of anxiety reported by subjects who receive training. These changes bring the initially anxious subjects' scores closer to the levels of anxiety reported by the control group. Analyses of covariance with the pre manipulation score used as the covariate to control for regression effects indicate that after training the treatment and control groups are not different from one another on the state factor; for the state anxiety scores there is an F of 1.62 ($p < .20$; Table 6). Treatment and control groups are still significantly different on the trait anxiety index. The trait anxiety values have an F equal to 9.48 ($p < .001$). Following course instruction and counterconditioning training, the state anxiety levels of treatment and control subjects are comparable; the same is not true for the trait anxiety factor. Analyses of the treatment groups alone reveal that the two groups do not differ after training. F values for both anxiety measures are less than 1.85 (Table 7). The systematic desensitization and conditioned relaxation groups are still similar after training. Changes occurring in one group appear to occur in the other, too.

Multiple regression analyses are employed to test for significant changes in the levels of anxiety for subjects in the control and treatment conditions.

Each of the post manipulation factors is regressed on the corresponding pre manipulation score, a dummy-coded variable distinguishing between control (=0) and treatment groups (=1) and a second dummy-coded variable differentiating between S. D. and C. R. training methods (control or C. R. training =0; S. D. training =1). This procedure meets the problem of taking into account the change in the control group while also controlling for the potential regression effect due to the way in which the training group subjects were selected. Table 8 shows that after statistically holding constant the pre manipulation scores, there are Betas of -.15 and -.31 for the first dummy variable in relation to the respective state and trait factors. The standardized regression coefficient for the state anxiety index closely approaches, yet fails to achieve significance (Beta = -.15; $p < .08$). Contrary to hypothesis, those persons receiving counterconditioning training do not reduce their levels of anxiety significantly more along this dimension. Both control and treatment subjects' state anxiety scores change substantially. Desensitization and conditioning training do reduce trait anxiety significantly as compared to course instruction alone (Beta = -.31; $p < .001$).

The second dummy variable distinguishing between the types of training has a nonsignificant Beta for each of the dependent indices. Holding constant the "pre-test" and the "control vs. treatment" variables, there is a Beta of +.04 for the second dummy coded variable in predicting state anxiety. Similarly, there is a Beta of -.07 for the dummy variable differentiating type of training in relation to the trait anxiety variable. These nonsignificant Betas, as well as the lack of significant changes in the $R's^2$ as the dummy variable is entered, provide evidence that there is no appreciable difference between the effects of S. D. as opposed to those of C. R. training.

CONCLUSIONS

Comparisons of the anxiety scores in the control and treatment conditions indicate that behavioral training can, in part, reduce subject reports of anxiety about speaking in small groups and before large audiences. The first two hypotheses are supported only in terms of reducing subjects' trait anxiety about public speaking. Subsequent to training, subjects increasingly report looking forward to speaking in public and they tend to feel that they have had a pleasant experience after speaking. Systematic desensitization is again shown to be a useful method for reducing apprehension about public speaking; cue-controlled (conditioned) relaxation is also shown to be effective. Moreover, S. D. and C. R. appear to be highly comparable in reducing anxiety along this dimension; the comparable effectiveness of conditioned relaxation gains considerable importance, as this technique has numerous advantages not found in the more commonly used systematic desensitization method.

Control and treatment subjects show substantial reductions in state anxiety. Again there are no apparent differences between the two training methods in lowering anxiety along this factor. Neither counterconditioning program, however, leads to statistically lower state anxiety as compared to the control group.

In summary, both systematic desensitization and conditioned relaxation are shown here to be effective in reducing the trait dimension of speech anxiety. Neither method reduces anxiety significantly in terms of the state dimension. Where one method is effective, the other is effective; the converse is true also. Hypothesis number three is supported in relation to both anxiety factors.

Caution is warranted in evaluating these findings. The systematic desensitization and conditioned relaxation subject methods are evaluated in this study in terms of their ability to lessen anxiety beyond the reduction in the classroom. Previous research has shown both S. D. and C. R. to be viable methods independent of variables such as class activities. Indeed, it is possible that even the state anxiety factor can be significantly influenced by the counterconditioning programs used alone--thus indicating an effect shared with the communication classroom experience. The self-selection of subjects can also lead to formidable problems in data interpretation. Conceivably, certain variables may lead individuals to accept counterconditioning training and at the same time enhance the effect of such training. There is no evidence that this is the case here, though the lack of apparent distinguishing subject characteristics does little to eliminate the potential. Future investigators in this area would do well to evaluate these problems to ascertain the generalizability of the findings. Research is needed to replicate and further validate conditioned relaxation as an effective, alternative method for dealing with anxiety. An appropriate next step would be to apply measures similar to those used to validate systematic desensitization both independently and concurrently with experience-oriented communication classes.

FOOTNOTES

[1]Charles Ertle, "A Study of the Effects of Homogeneous Grouping on Systematic Desensitization for the Reduction of Interpersonal Communicative Apprehension," unpublished Ph.D. dissertation, Michigan State University (1969).

[2]C. D. Spielberger, R. L. Gorsuch and R. E. Lushene, STAI Manual for the State-Trait Anxiety Inventory (Palo Alto: Consulting Psychologists Press, 1970), p. 3.

[3]Charles Ertle, "A Study of the Effects of Homogeneous Grouping on Systematic Desensitization for the Reduction of Interpersonal Communicative Apprehension," (1969), p. 3.

[4]Joseph Wolpe, Psychotherapy and Reciprocal Inhibition (Stanford: Stanford University Press, 1958).

[5]David Rimm and John Masters, Behavior Therapy (New York: Academic Press, 1974), pp. 46-52.

[6]Ibid., pp. 57-60.

[7]Gordon Paul, "Outcome of Systematic Desensitization. II: Controlled Investigations of Individual Treatment, Technique Variations and Current Status," in Behavior Therapy: Appraisal and Status, (ed.), C. M. Franks (New York: McGraw-Hill, 1969).

[8]Joseph Wolpe, "The Systematic Desensitization Treatment of Neuroses," Journal of Nervous and Mental Disorders, 132 (1961), 189-203; S. Rachman, "Studies in Desensitization. I: The Separate Effects of Relaxation and Desensitization," Behavior Research and Therapy, 3 (1965), 245-252; Rimm and Masters, Behavior Therapy, 43-76.

[9]Gordon Paul, Insight vs. Desensitization in Psychotherapy (Stanford: Stanford University Press, 1966); James Barrick, James McCroskey and David Ralph, "The Effects of Systematic Desensitization on Speech and Test Anxiety," unpublished paper presented to the Speech Association of America Convention (1968); Russel Meyers, "Validation of Systematic Desensitization of Speech Anxiety Through Galvanic Skin Response," Speech Monographs, 41 (1974), 233-235.

[10]Peter Lang and David Lazovik, "Experimental Desensitization of a Phobia," Journal of Abnormal and Social Psychology, 66 (1963), 519-525.

[11]Richard Russell and James Sipich, "Cue-controlled Relaxation in the Treatment of Test Anxiety," Journal of Behavior Therapy and Experimental Psychiatry, 4 (1973), 47-49.

[12]Wolpe, Psychotherapy and Reciprocal Inhibition, (1958).

[13]Douglas Bernstein and Thomas Borkovec, Progressive Relaxation Training: A Manual for Helping Professions, (Champaign: Research Press, 1973).

[14]Russell and Sipich, "Cue-controlled Relaxation in the Treatment of Test Anxiety," p. 48.

[15]Ibid., p. 49.

[16]The format used with these scales is like the PRCA test employed by Ertle and McCroskey, in Ertle, "A Study of the Effect of Homogeneous Grouping on Systematic Desensitization for the Reduction of Interpersonal Communicative Apprehension," pp. 57-58. For a copy of the final instrument, please write this author.

[17]Research has shown desensitization training in groups to be efficient and effective, Gordon Paul and Donald Shannon, "Treatment of Anxiety Through Systematic Desensitization in Therapy Groups," Journal of Abnormal Psychology, 71 (1966), pp. 124-135.

[18]The use of "lay personnel" has been shown to not affect the outcome of systematic desensitization training, Barrick, McCroskey and Ralph, "The Effects of Systematic Desensitization on Speech and Test Anxiety," p. 14; similar results are found in Richard Russell and David Ralph, "Public Speaking Anxiety Reduction Program: A Preliminary Report," unpublished progress report, Winter (1973).

Table 1

Summary of One-Way Analyses of Variance of Pre-Test Means for Two Measures of Anxiety in Control and Treatment Groups

Anxiety Index / Source of Variation	Sum of Squares	D.F.	Mean Squares	F	Significance
State					
Between	17.79	2	8.89	11.40	<.001
Within	76.10	98	.78		
Total	93.89	100	.94		
Trait					
Between	9.30	2	4.65	6.20	<.005
Within	73.76	98	.75		
Total	83.06	100	.83		

Table 2

Summary of t-Tests of Pre-Test Means for Two Measures of Anxiety in Treatment Groups

Anxiety Index Group	Mean	Standard Deviation	D. F.	t	Significance
State					
S. D.	.64	.49	16	.06	<.90
C. R.	.63	.76			
Trait					
S. D.	.68	.47	16	1.01	<.40
C. R.	.41	.65			

Table 3

Summary of t-Tests of Correlated Pre and Post-Tests Means for Two Measures of Anxiety in Control Groups

Anxiety Index	Pre-Test Mean	Post-Test Mean	D.F.	t	Significance
State	-.46 s.d. = .92	-.70 s.d. = .88	82	2.95	<.005
Trait	-.24 s.d. = .92	-.32 s.d. - .86	82	1.11	<.30

Table 4

Summary of t-Tests of Post-Test Means for Two Measures of Anxiety in Control and Post-Test Only Groups

Anxiety Index	Control Mean	Post-Test Only Mean	D.F.	t	Significance
State	-.70 s.d. = .88	-.60 s.d. = .89	136	-0.65	<.60
Trait	-.32 s.d. = .86	-.33 s.d. = 1.04	136	.06	<.90

Table 5

Summary of Pre and Post-Test Means Plus Change Scores for Two Measures of Anxiety in Treatment Groups

Anxiety Index / Group	Pre-Test Mean	Post-Test Mean	Mean Change Score
State			
S. D.	.64 s.d. = .49	-.40 s.d. = .39	-1.04 s.d. = .48
C. R.	.63 s.d. = .76	-.30 s.d. = .45	-.93 s.d. = .78
Trait			
S. D.	.68 s.d. = .47	-.26 s.d. = .34	-.94 s.d. = .46
C. R.	.41 s.d. = .65	-.63 s.d. = .53	-1.04 s.d. = .50

Table 6

Summary of Analyses of Covariance of Post-Test Means for Two Measures of Anxiety in Control and Treatment Groups

Anxiety Index / Source of Variation	Sum of Squares	D.F.	Mean Squares	F	Significance
State					
Covariate	28.91	1	28.91	72.86	<.001
Between	1.29	2	.64	1.62	<.20
Within	38.49	97	.40		
Total	68.69	100	.69		
Trait					
Covariate	28.84	1	28.84	92.48	<.001
Between	5.88	2	2.94	9.48	<.001
Within	30.25	97	.31		
Total	64.97	100	.65		

Table 7

Summary of Analyses of Covariance of Post-Test Means for Two Measures of Anxiety in Treatment Groups

Anxiety Index Source of Variation	Sum of Squares	D.F.	Mean Squares	F	Significance
State					
Covariate	.27	1	.27	1.60	<.30
Between	.04	1	.04	.24	<.70
Within	2.52	15	.17		
Total	2.84	17	.17		
Trait					
Covariate	1.39	1	1.39	9.75	<.01
Between	.26	1	.26	1.85	<.20
Within	2.14	15	.14		
Total	3.79	17	.22		

Table 8

Summary of Stepwise Multiple Regression Analyses for Two Measures of Anxiety in Control and Treatment Groups

Dependent Variable	Variables in the Equation	Beta	R	R^2	Significance
State Anxiety, Post-Test Score					
	Pre-Test Score	+.71			<.001
	Control vs. Treatment Group	-.15			<.08
			.66	.44	<.001
	Pre-Test Score	+.71			<.001
	Control vs. Treatment Group	-.12			<.25
	C. R. vs. S. D. Training Group	+.04			<.72
			.66	.44	<.001
Trait Anxiety, Post-Test Score					
	Pre-Test Score	+.77			<.001
	Control vs. Treatment Group	-.31			<.001
			.73	.53	<.001
	Pre-Test Score	+.77			<.001
	Control vs. Treatment Group	-.36			<.001
	C. R. vs. S. D. Training Group	-.07			<.49
			.73	.53	<.001